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April 25, 2000

Ms. Magalie Roman Salas, Secretary
Federal Communications Commission
The Portals
445 Twelfth Street, S.W.
12th Street Lobby, TW-A325
Washington, DC 20554

Re: Ex Parte Submission
IB Docket No. 95-91 and GEN Docket No. 90-357

Dear Ms. Salas:

Sirius Satellite Radio Inc. ("Sirius"), by its attorneys, submits the attached public information for inclusion in the record of the above-captioned proceeding, which seeks to adopt rules for the use of terrestrial repeaters in the provision of satellite digital audio radio service ("satellite DARS").

This public information describes the on-going conversion of multichannel multipoint distribution service ("MMDS") technology to broadband fixed wireless use. These news stories support Sirius' conclusion that coordination of satellite DARS terrestrial repeaters would be limited to the few, if any, legacy analog MMDS receivers that remain in existence until February 19, 2002, the date on which MMDS operators lose interference protection from adjacent WCS spectrum operations.[1] They also confirm that MMDS operators already have strong economic incentives to upgrade their analogy systems to digital technology.[2] Accordingly, the FCC should not require satellite DARS operators to assume the burden of funding the existing MMDS technology conversion when it adopts service rules for terrestrial repeaters. To do so would provide an unfair and unnecessary windfall to MMDS providers.

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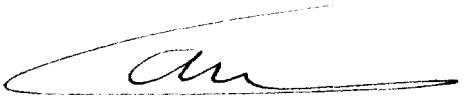
1 *Sirius Reply Comments*, at 6-9 (filed Mar. 8, 2000); *Sirius Supplemental Comments*, at 10-11 and Exhibit 2 (filed Jan. 18. 2000).

2 *Sirius Reply Comments*, at 11-12.

Should there be any questions concerning this matter, please contact the undersigned.

Sincerely,



Carl. R. Frank

Enc. News Stories
cc: Service List

November 8, 1999

LENGTH: 680 words

HEADLINE: Coming Attractions -- Evolving Broadband Fixed Wireless Networks Draw Vendors

BYLINE: Carl Weinschenk

BODY:

There's an obsession for everyone and everything. Bears love honey, and moths are drawn to flames. Vendors and their partners? They can't keep away from networks. Just look at broadband fixed wireless. This seemingly dormant category accelerated this year when MCI WorldCom Inc. and Sprint Corp. started gobbling up companies that hold most of the multichannel multipoint distribution service (MMDS) spectrum. Now vendors are itching to supply gear to these two companies, which control enough spectrum to serve 50 million homes, as well as other providers using similar equipment in MMDS and related spectrum ranges.

Of course, the technical problems that made broadband fixed wireless a bargain-basement special must be solved before the good times can roll. That job is being taken on by an 11-company consortium led by Cisco Systems Inc. (San Jose, Calif.).

The high-profile group brings unprecedented muscle to the challenge, which is a good thing. The problems that have thwarted the development of broadband fixed wireless are formidable. Wireless signals, for example, tend to disperse in rain and either bounce around or get absorbed when they hit foliage, buildings and other obstacles. This leads to generally weak signals and "multipathing," the arrival of various versions of the same transmission at slightly different times. The bottom line is a drastic reduction in the reach and quality of wireless systems.

The Cisco-led consortium aims to go beyond just solving these problems. It hopes to improve the ability of these networks to handle bursty Internet traffic, while also offering new tools for quality of service (QoS), service-level agreements (SLAs) and other demanding applications and services.

The consortium is relying on a specialized version of an emerging family of modulation techniques called orthogonal frequency-division multiplexing (OFDM) to overcome interference. In telecommunications, modulation refers to the way data -bits, in this case-are put on carrier waves for transmission. OFDM's approach is to simply cut a channel-a carrier wave operating at a specific frequency-into smaller chunks, or subchannels, which can be processed in ways that can't be applied to the channel as a whole.

The consortium's tweak, vector OFDM (VOFDM), involves a second antenna, which can be cheaply fit into the housing for the primary unit. It creates a second set of parameters on important components of each subchannel, says Greg Raleigh,

Cisco's director of wireless engineering. The information emerging from the mathematical weighing of both the stronger and weaker signals yields a reconstituted signal far clearer and stronger than either of the originals.

The second element of the consortium's plans centers on the media access control (MAC) layer. The MAC protocol allows a central point, perhaps a base station, to recognize if and when signals are coming from a particular sender. The MAC protocol suggested by the consortium is a stepchild of those used in Ethernet and most North American cable modem systems. Its advantage is in being able to use subchannels created by the VOFDM modulation technique to much more efficiently handle spikes in Internet traffic. These subchannels will also help support QoS, SLAs and other sophisticated applications, says Raleigh.

The consortium's efforts, while important, may not be the only solution to the problems facing broadband fixed wireless networks. The scheme employed in high-definition television (HDTV), which also faces multipath challenges, may offer an alternative, says Paul Henry, the division manager for broadband wireless systems research at AT&T Bell Laboratories (Holmdel, N.J.).

Although other solutions may emerge, the names on the consortium's roster represent a potent attack. While Henry doesn't think the technology is immediately applicable to Project Angel, AT&T's residential fixed wireless entry, he applauds the initiative. "I have not heard such a strong voice in the past," he says. "I think it's great."

LANGUAGE: ENGLISH

LOAD-DATE: November 7, 1999

MCI WorldCom Tests Broadband Wireless

By *Dawn Bushaus*, Inter@ctive Week
March 23, 2000 10:43 AM PT
URL: http://www.zdnet.com/intweek/stories/news/0,4164,2472604,00.html

It's not exactly MMDS, but it's close enough for MCI WorldCom to start a trial run. The carrier that invested heavily last year in licenses to operate broadband wireless networks based on Multichannel Multipoint Distribution Service technology is now testing an MMDS-like service with corporate customers in three markets, with two more test markets planned for later this year.

The service trials involve two-way high-speed wireless service delivered to about a dozen corporate customers as well as some residential customers in Baton Rouge, La.; Jackson, Miss.; and Memphis, Tenn. A few hundred end users will be involved in the service trials, according to MCI WorldCom (www.wcom.com).

Although the trials are a step toward rolling out their MMDS-based services, the test networks actually are operating at a frequency that's adjacent to MMDS, which runs at the 2.1 gigahertz and 2.5 to 2.7 GHz tiers. The trial networks are running at the 2.3 GHz spectrum tier, in the Wireless Communication Service (WCS) band, in which MCI WorldVCom also holds licenses.

MCI WorldCom says it decided to use the WCS band for trials rather than wait for the Federal Communications Commission to approve its MMDS licenses, which the carrier acquired last spring in several deals. Equipment used in the current service trials will operate at MMDS frequencies.

MCI WorldCom is targeting corporate markets with a service called Warp- One, which includes both high-speed Internet access and Web hosting.

In addition to WarpOne, MCI WorldCom is testing a consumer-class service called Warp 310, named for its 310-kilobit-per-second throughput. Warp 310, priced at about $40 per month, is being provided via a wireless local area network product from Lucent Technologies (www.lucent.com). The Lucent product can operate at link distances up to 1,500 feet.

Hybrid Networks (www.hybrid.com) is supplying the equipment for the current corporate service trials. MCI WorldCom plans to expand these trials to Boston and Dallas this summer. The carrier's plan is to offer fixed wireless broadband service in 100 cities by late 2001.

60 metro markets

The key to that deployment will be MMDS. Last spring, MCI WorldCom and the soon-to-be-acquired Sprint (www.sprint.com) spent more than $1 billion on MMDS licenses in a string of acquisitions. All told, the MCI WorldCom-Sprint MMDS licenses

cover more than 60 metropolitan markets nationwide.

Ultimately, MCI WorldCom and Sprint see MMDS competing directly with broadband wireline options Digital Subscriber Line and cable modem service. But MMDS still has some hurdles to clear. There is still a dearth of reliable, next-generation equipment that is capable of two-way transmission, and deployment costs are deemed high by many. With MCI WorldCom in the market and suppliers eager to provide equipment for it, the cost barrier could be changing soon, say some in the industry.

"By next fall, broadband wireless is going to be a lot less expensive than DSL and cable," predicts Ralph Muse, chief executive of NextNet, an MMDS equipment player. Muse says that with cable operators looking at $1,000 per home to deploy cable modems, once MMDS is fully two-way deployable, it will be much more cost-effective.

"From NextNet's perspective, I am happy that WorldCom is deploying available hardware today as fast as possible," says Muse, who sees the trials as jump-starting MMDS. It's also a good opportunity for his company, as its products are complementary to the systems available today.

Other players, including ADC Telecommunications and Cisco Systems, are likely to be tapped for the upcoming MMDS trials in Boston and Dallas.

March 20, 2000

LENGTH: 1258 words

HEADLINE: Wireless Fixations -- Service providers focus on point-to-multipoint rollouts

BYLINE: Kate Gerwig

BODY:

When Nextlink Communications Inc. (McLean, Va.) lays fiber in historic downtown Boston, it is required to number the cobblestones so they are put back in the same order. Preservation is only one of the limiting factors for service providers that want to reach customers with high-speed Internet services. The time and money needed to bring fiber to the desktop has also curtailed the service providers' ability to make widespread broadband rollouts. But using fixed wireless technology to skip fiber and copper altogether could soon become a reality, as a variety of service providers test the technology's scalability with an eye toward deployments this year and next. As with any new technology, however, instant success is far from guaranteed.

While copper is nearly ubiquitous after a century of deployment, its ability to support high-speed service is limited over distance. Coaxial cable largely reaches residences, not businesses. Unfortunately, fiber optic cable reaches only about 5 percent of the estimated 750,000 office buildings in the United States, according to International Data Corp. (IDC, Framingham, Mass.), leaving a huge number of potential customers for wireless broadband services. Several providers, therefore, hope broadband fixed wireless services will enable them to offer high-speed Internet access without laying fiber to office and apartment buildings and individual homes.

"Fixed wireless is a useful addition to a carrier's technology tool bag," says Mark Zohar, an analyst at Forrester Research Inc. (Cambridge, Mass.). " Wireless broadband technology has a long way to go to prove itself but promises to offer certain advantages, like time to market, especially in areas outside the urban core."

Companies including MCI WorldCom Inc., Sprint Corp., AT&T, Teligent Inc. (Vienna, Va.), WinStar Communications Inc. (New York) and Nextlink are all in fixed wireless deployment and trial mode, with major rollouts scheduled to continue through 2001 (see "Fixed Assets") if the business model proves competitive.

Providers with different bands of spectrum have been deploying point-to-point wireless systems for a few years, but they're now adding point-to-multipoint systems to reach more users efficiently. The plan is for fixed wireless services to become a third alternative-along with digital subscriber line (DSL) and cable modems-for broadband access to the Internet. But even if fixed wireless can be viewed as a cheap alternative to traditional terrestrial

networks, it still poses a few challenges. For one thing, service providers have yet to figure out how to market it.

"I don't think fixed wireless is even in the public awareness yet. If you read about broadband, you'll see articles about DSL and cable modems, but you're just beginning to hear about fixed wireless," says Tim Sutton, president of the Sprint Broadband Wireless Group. In addition, fixed wireless is subject to some technical limitations, such as the requirement that signals have a clear line-of-sight path for travel between the base station and the rooftop antenna. Weather affects wireless signals, too, with rain and snow sometimes causing static, dropped calls and bad connections.

WinStar senior vice president of network and customer operations Kevin Lombardo agrees that providers initially didn't engineer fixed wireless properly because they weren't sure how to deploy it as a commercial technology. Lombardo maintains that fixed wireless can be highly reliable. Eventually, effective use of point-to-multipoint fixed wireless could prompt WinStar, which concentrates on the business market, to enter the residential market because the technology is cheap to deploy and can light massive numbers of buildings in one shot.

Right now, the providers interested in fixed wireless are concentrating on either the consumer or business markets for trying point-to-multipoint services, with MCI WorldCom, Sprint and AT&T looking more at adding residence customers and Teligent, WinStar and Nextlink eyeing smaller office buildings.

Both Sprint and MCI WorldCom have been aggregating multichannel multipoint distribution service (MMDS) spectrum, formerly designated for distance learning and wireless cable video services. The ability for an MMDS signal to reach up to 35 miles makes it possible to target smaller cities and rural areas that will never see DSL deployment, says Kerry McKelvey, vice president of marketing for MCI WorldCom Wireless Solutions. MCI WorldCom is looking at fixed wireless as a service it can offer effectively after its planned merger with Sprint. Together, the combined company would have enough spectrum to cover about two-thirds of the country with fixed wireless services, reaching 54 million homes in second- and third-tier cities.

Despite its relatively long reach compared with other frequencies, MMDS spectrum comes with its own challenges, including an obligation to work with educational facilities around the country to provide them with learning services. That means MCI WorldCom has to negotiate with individual schools on how to serve them as well as its residential customers, says Jonathan Mapes, chief technology officer of MCI WorldCom Wireless Solutions. Even so, Mapes believes MCI WorldCom can deploy fixed wireless broadband services before DSL and cable modem service will reach customers outside major metropolitan areas.

To push deployment of fixed wireless service, MCI WorldCom will hold three fixed wireless trials in Memphis, Tenn., Jackson, Miss., and Baton Rouge, La., this summer. The company will test several types of service bundles and price points to determine its acceptance among residential and small-business customers. MCI WorldCom's McKelvey says a consumer service probably will be priced at about $40 a month, while a symmetrical business service would be $300 to $600.

Sprint is already testing two-way fixed wireless services in Phoenix, Detroit and San Francisco. Sutton says Sprint doesn't need access to building wiring to

deploy MMDS, which makes it easier because customers only need to place a 10-inch antenna on their premises. Sutton says an asymmetrical service will most likely include 2 Mbit/s downstream, with 256 kbit/s on the upstream for consumers and 512 kbit/s for businesses. Prices, he says, will be competitive with DSL and cable access.

"Philosophically, we believe in DSL and in what we're doing with fixed wireless," says Sutton. "We believe both will evolve over time and find their own niches, but they won't be exactly the same. Fixed wireless will increase the reach of broadband services to entire classes of people who would otherwise be left out-people in rural areas that surround metropolitan areas."

On the business side, Nextlink plans to deploy point-to-point fixed wireless connections to midsize buildings in metropolitan areas and augment those with point-to-multipoint connections to smaller buildings, says chief technical officer Doug Carter. "To fill in the gaps between copper and fiber, fixed wireless has natural capabilities," he says, regarding the company's 20- to 30-gHz local multipoint distribution service (LMDS) spectrum.

But Nextlink's plans are still mostly on paper. The company has two operational multipoint sites but plans to be in 25 markets with LMDS by year's end, says Carter. If that happens, Nextlink may find itself adding up lots of new broadband customers instead of old cobblestones.

http://www.teledotcom.com/

LANGUAGE: ENGLISH

LOAD-DATE: March 18, 2000

■ *Fixed wireless for faster connections*

MCI WorldCom focuses on launching MMDS strategy

BY ELIZABETH V. MOONEY

NEW YORK—For about $2,000 per square mile, MCI WorldCom Inc. expects to launch multichannel multipoint distribution service systems able to give its fixed wireless customers data access at speeds faster than T-1 connections.

That is the vision the carrier is working to make a reality, John Stupka, president of MCI WorldCom's wireless solutions division, said in a presentation here earlier this month.

If it succeeds, the Clinton, Miss., carrier may help dispel some of the negatives associated with broadband wireless connectivity.

"For years there have been a number of technical and business problems preventing a widespread penetration of broadband connections between customers' premises and service providers," the Personal Communications Industry Association said in its January "Broadband Alert."

"Either it was too complicated or too expensive, and the benefits of deploying new networks combining just voice and video services seemed too low."

MCI WorldCom will be able to adjust speeds to the needs and pricing plans individual customers want, Stupka said. Those wanting speeds of 1.5 Megabytes per second, faster than T-1 connections, likely would pay about $125 per month for the service. Those for which 200 Kilobytes per second is sufficient would probably pay about $40 per month.

"Installation costs of about $400 to $500 per household are pretty reasonable in the near term," Stupka said.

"There is a significant need for this in residential areas. An even larger target for us are small and medium-size businesses, which in many cases are not served by either cable (television) or the local phone company."

MMDS technology can be tinkered with in three basic ways to boost its capabilities and efficiencies, Stupka noted. Channelization allows for either dividing larger channels into smaller ones or aggregating smaller channels into larger ones. Sectorization permits the division of transmitter signals into multiple sectors. Cellularization allows the migration to a cellular architecture for the purposes of frequency reuse.

"A good portion of your expense in setting up a wireless network is not the radio but the towers and the power," Stupka said.

"The cellularized version of MMDS has tremendous synergy as a cellular overlay."

MMDS spectrum is derived from prior attempts to promote wireless cable television, which relies on one-way communications into the customer premises. "Two-way MMDS is still in its early stages, but the major technology vendors have been working with us for the last year," Stupka said.

"Deployment began late, but we expect to be in 100 markets by late 2001."

Today, MCI WorldCom is conducting trials in five cities. In Memphis, Tenn., Jackson, Miss., and Baton Rouge, La., the company is testing business access at speeds faster than T-1 connections. In the coming months, it plans to expand its trials to residential neighborhoods.

"In Boston, we are working with a multicell design for dense urban markets, and we will beta test customers with several packages in a late-year rollout," Stupka said.

"In Dallas, we were working with Cisco (Systems Inc.) supplying premise equipment and Motorola (Inc.) providing systems integration, to use fewer cells and eliminate the line-of-site issue."

Stupka

Stupka formerly was chief executive of SkyTel Communications Inc., the two-way messaging company MCI WorldCom acquired in a transaction that closed Oct. 1. Four days later, MCI WorldCom announced a definitive agreement to merge with Sprint Corp. Like MCI, Sprint has been a major buyer of fixed wireless operators in the MMDS band.

In its 1999 fiscal year-end report, released in February, MCI WorldCom said both companies expect their merger to close during the second half of this year. To do so, they would need, among other things, permission from the Federal Communications Commission and the U.S. Department of Justice.

However, the Legg Mason Precursor Group, Washington, D.C., said in mid-March it expects "in the next several months the Antitrust Division of the Department of Justice [will] seek and win a court injunction to halt the pending MCI WorldCom-Sprint merger from proceeding, effectively scuttling this merger."

Among the most salient roadblocks to DOJ approval is the fact that Sprint and MCI WorldCom have "fully integrated networks and operations" ranking in the top three in "several highly concentrated, interdependent markets," Legg Mason said.

Another key issue for the Justice Department is MCI WorldCom's lock on the Internet backbone network, notwithstanding its apparent willingness to divest Sprint's Internet backbone.

Legg Mason said it believes the Justice Department "will conclude that opposing this merger is its best available option to protect competition in this key 'new economy' Internet backbone market."

Furthermore, Scott Cleland, lead author of the Legg Mason analysis, quoted FCC Chairman William Kennard as saying the merger announcement "appears to be a surrender" that would not benefit consumers.

If this merger is blocked, the Precursor Group offered several possible results.

"MCI WorldCom could turn its growth-by-acquisition strategy on other industries like local telco or wireless. Remedying [its] strategic weakness in wireless could prove more costly now, given the market euphoria for wireless data ... It puts MCI WorldCom back in the wireless musical chairs game chasing the fewer chairs available, like Nextel (Communications Inc.)," the analysts said.

Sprint, on the other hand, likely would become an acquisition target for other companies, possibly Deutsche Telekom., BellSouth Corp. or Qwest Communications International Inc., in Legg Mason's view.

Federal action to block a Sprint-MCI WorldCom merger could have an overall "chilling effect" on combinations that require accompanying divestitures of certain properties, the Precursor Group said. Paradoxically, however, the same environment could also prompt domestic carriers seeking partners to pair with foreign suitors.

GroupServe markets "in-time communications" to wireless business customers

BY HILARY SMITH

Led by an executive team that includes a lawyer, a doctor, an analyst and an engineer, GroupServe Inc. offers software applications that allow business customers the ability to organize, collaborate and communicate in an electronic group environment.

Based in Washington, D.C., GroupServe introduced its GroupVine service for personal computers last September, and announced the wireless version for Palm, Nokia Communicator and Microsoft Windows CE Pocket Internet Explorer personal digital assistants, and the Qualcomm Inc. pdQ smart phone in December.

GroupVine allows users with Internet-enabled devices to enter discussion forums—which can be run privately, publicly or by invitation—and leave voice and/or text messages, as well as documents for participating group members to access and review.

According to Dr. Theodore Achacoso, a former computational neuroscientist and GroupServe's president, chief technology officer and co-founder, GroupVine provides "in-time communications." Users don't all need to be logged on at the same time for the application to work, unlike real-time chat services.

He said the early adopters in the United States have been business-to-business groups, which also are being targeted by Nextel Communications Inc. for its Direct Connect two-way radio service.

However, "There's no one doing text and voiceless fax," Achacoso said. "Nextel is finding that as they roll out their services to the white collar community, the Direct Connect service won't work for them."

Nextel Direct Connect is an alternative to cellular phones for business or consumer groups that want to have instant voice access to any or all individuals in a custom talk group.

Right now, Achacoso said the company's main sales pitch is to carriers, which for GroupServe, also includes Nextel.

"We are trying to close out deals with the carriers to carry the GroupVine service for free. Whatever revenues that we do from ads will be split with the carriers," said Achacoso, who further explained that if carriers won't offer the service for free, a monthly charge of about $3 also could cover costs.

GroupServe said it commenced commercial data testing of its GroupVine software for Wireless Application Protocol-enabled phones at the end of January, and in February it introduced a forum to establish a groupware standard.

Known as Groupware Data Exchange, the forum was created to establish a new standard called Groupware Markup Language, which will facilitate data exchange and synchronization among the various groupware applications and their individual counterparts, GroupServe said.

ePhones signs agreements with 50 wireless retailers

FREMONT, Calif.—Online telecom and wireless service provider ePhones announced agreements with 50 wireless retailers nationwide to create a multichannel telecommunications network.

The agreements create an online network of wireless retailers, providing them access to ePhones' wireless e-commerce engine, proprietary rate plan database, nationwide carrier agreements and online access to a range of wireless and telecom services.

"By partnering with strong local and regional players, we can leverage their offline marketing programs and local market expertise," said Michael Merril, chairman and chief executive officer of ePhones. "At the same time, we're giving them greater breadth and depth of their product offerings, better pricing and helping them use the Internet to improve operational efficiencies."

MCI WorldCom's Wireless Fix May Be Key

By *Meg McGinity*, Inter@ctive Week
April 7, 2000 8:36 AM PT
URL: http://www.zdnet.com/intweek/stories/news/0,4164,2522386,00.html

MCI WorldCom is hoping that its fixed wireless plans will be the key to unlocking the approval process in its planned merger with Sprint.

The companies collectively spent more than $1 billion in obtaining licenses for fixed wireless Multichannel Multipoint Distribution Service technology. MCI WorldCom and Sprint have communicated to the Federal Communications Commission that their investment will help foster MMDS as an alternative service for broadband access.

"It's one of the key arguments behind our merger," said MCI WorldCom spokesman Joe Paluska. "When the merger closes, we'll be able to serve underserved rural areas."

Analysts gave a thumbs-up to the MCI WorldCom sell. "I don't know if it's going to work, but it's a good tactic," said Mike Paxton, an analyst at research firm Cahners In-Stat Group. " 'Increase competition in the broadband arena' are magic words to the FCC."

MCI WorldCom (www.wcom.com) and Sprint (www.sprint.com) are looking to roll out MMDS services sooner rather than later. The longer the wait, the more other broadband service pro viders will move in to fill the breach, Paxton noted. "I understand their anxiousness to get things cranked up," he said.

The combined MMDS license holdings give MCI WorldCom and Sprint access to 60 million homes. If the two merge, economies of scale could allow for speedy MMDS service rollout, Sprint spokes man Russ Robinson said.

Tower sitings

For instance, Sprint's wireless service, Sprint PCS, has towers sited around the country. MMDS equipment can be co-sited on these existing towers. In addition, sorting out interference issues of the spectrum will be much easier when the companies are on the same team, Paluska said.

"Our wireless assets, our fiber, mean we can get out much quicker to areas that would be at the bottom of the cable companies' and RBOCs' 'regional Bell operating companies" lists — places like Billings, Mont.," Robinson said.

MCI WorldCom already has heralded MMDS service trials. On March 27, the company announced MMDS service tests in Boston, having previously unveiled plans to try out high-speed fixed wireless in Baton Rouge, La.; Jackson, Miss.; and Memphis, Tenn. According to MCI WorldCom and Sprint, their fixed wireless services will be up and running in 100 cities by end of 2001.

MCI WorldCom is expecting that the merger will get the green light from regulatory

MCI WorldCom is expecting that the merger will get the green light from regulatory bodies, including the De partment of Justice and the FCC, by the second half of this year. But even if the merger is endorsed, MMDS will still present challenges, industry analysts said. Line-of-sight issues and interference mean that MCI WorldCom will have to choose carefully where the services are rolled out. And while MCI WorldCom has chosen ADC Telecommunications to provide equipment in its Boston market, experts believe there is still a dearth of robust hardware available.

December 2, 1999, Thursday

SECTION: TODAY'S NEWS

LENGTH: 604 words

HEADLINE: CISCO SAYS ITS MMDS STANDARD WILL HELP DSL AND CABLE ROLLOUTS

BODY:

First application for Cisco's new wireless data standard (CD Oct 28 p8) will be filling coverage gaps for variety of carriers, with direct business applications expected early next year, consumer applications by end of year, executives said. In Wed. conference call with analysts and reporters to discuss Vector Orthogonal Frequency Division Multiplexing (VOFDM) standard for MMDS spectrum, Wireless Mktg. Mgr. Steve Smith said technology will be available to carriers in "about a week" and already is being tried out by several, including ExciteAtHome. Greg Raleigh, who joined Cisco along with developing technology when it acquired his Clarity Wireless last year, said VOFDM will solve many of MMDS's problems, including turning multipath reception from liability into asset.

After 4 years of work by 100 engineers, Cisco found way to "wrap a lot of additional technology around VOFDM to increase its performance by an order of magnitude," Raleigh said. He said MMDS has needed direct line of sight between transmitter and receiver, requiring transmitters to be on very tall poles or mountaintops and often requiring subscribers to have antennas on 20-30 ft. masts, leading to zoning complications. New solution allows transmitter to broadcast to and receive from multiple base stations located on PCS towers or building sides, Raleigh said, leaving fewer coverage holes and allowing more bandwidth to be allocated to each subscriber. He said signal is broken into components, then reassembled by receiver, allowing multiple transmissions echoing off buildings objects and to aid reception, rather than hinder it. Raleigh said standard was designed to be applicable to variety of other wireless spectrums, including UHF band if and when Chs. 60-69 are opened by FCC.

Smith said Cisco designed standard to fit into telco and cable networks to help both industries meet demand for high-speed data service. Cisco officials said technology also is expected to facilitate competitive Internet and voice service entry for companies that don't have wire into home. First product available from Cisco is base station that is particularly helpful in crossing rivers or streets, Raleigh said. Smith said base station

costs $150,000 "fully loaded" and eventually will service 3,000 simultaneous online customers at DSL speeds. He said 5-10 times that number can be subscribers, since not everyone is online at once, meaning station can cost as little as $50 per subscriber. Executives said same spectrum can be used to serve business customers during day and consumers in evening, potentially allowing even more efficient service.

Eventually, technology will lead to consumer applications, bringing broadband into homes that can't be reached by other means, executives said. "There's no single access technology on the planet that reaches everyone," Cisco Exec. Vp Don Listwin said. Cisco has assembled consortium it calls Broadband Fixed Wireless Ecosystem to develop consumer devices, including dishes and services. Sprint and MCI WorldCom have bought up most of MMDS spectrum in last year and have said they expect 10-15% penetration, most in areas that are hard to serve cheaply with other technology. Telcos, which are merging, expect start-up costs for subscribers to fall to same $100-$400 as cable modems within 5 years. Cisco officials said their standard works with unlicensed spectrum that may permit quick, cheap entry by other ISPs. -- Sasha Samberg-Champion

LANGUAGE: ENGLISH

LOAD-DATE: December 1, 1999

Broad Agreement Sought

MMDS INDUSTRY GEARS UP ON STANDARDS ISSUES, SPECTRUM PLANNING

Broad array of MMDS license holders and equipment manufacturers is working on standard-setting issues for gear that will be deployed on much wider scale later this year by companies such as MCI WorldCom (MCIW) and Sprint. At same time, working group of service providers that first met last year is ironing out agreement on interference mitigation and technical coordination for 2-way MMDS licenses that FCC will begin considering in summer. Ramped-up activity comes as MCIW and Sprint are moving ahead on field testing of MMDS voice services, with trials for MCIW in Boston, Baton Rouge, Jackson, Miss., and Memphis. Meanwhile, Cisco Systems organized its own working group to focus on open standard using its technology for broadband wireless operations such as MMDS.

For air interface standards for MMDS equipment, recently formed Institute of Electrical & Electronics Engineering (IEEE) working group is focusing on broadband wireless access systems in 2-11 GHz range, which includes MMDS and other operations. IEEE has separate group examining air interface standards for 10-66 GHz range, which includes LMDS-based fixed wireless systems, said Roger Marks, dir.-national wireless electronic systems testbed for National Institute of Standards & Technology. Marks also is chairman of IEEE working group on broadband wireless access standards. Study group focusing on spectrum that includes MMDS is scheduled to choose baseline draft in first week of May that would address network elements such as medium access layer and physical layer.

"The lower frequency project is going to take advantage of common technology wherever possibly," Marks said. "It's reasonable that part of the standard would be shared." Group is planning to finalize standard for lower frequency range by March 2002, although operators are eyeing fuller deployments of MMDS systems targeting residential users much sooner, after wrapping up field tests that began this year. "The standard is actually available for use well before that publication date," Marks said. And while equipment will begin rolling out ahead of that date, when operators add to those deployments or make system enhancements they still can rely on standards for equipment launch, he said. IEEE working group is planning meeting with its European counterpart, European Telecom Standardization Institute, in May, Marks said. IEEE is examining lower frequencies in range that encompasses spectrum that's used for MMDS-like applications in both U.S. and Europe. "The intent is that we will reach an agreement" on ways to coordinate standards issues in both parts of world, he said. Point is that many operators that are planning to deploy systems in U.S. also are eyeing operations in Europe. "If you go to deploy a station in Europe, it's not going to be satisfactory to say that we wrote our own standards and we think they're fine," Marks said.

"We're not too concerned that standards aren't in place now," Sprint Vp-Spectrum Management Todd Rowley said, with company working "very closely" with IEEE and vendors on issue. Because window for 2-way filings doesn't open until July, he said, "we're looking at the 4th quarter before we can go to market in a big way."

Meanwhile, Cisco organized group of companies in Oct., including Motorola and Texas Instruments, to back open standard for broadband wireless operations. Technology based on standard, vector orthogonal frequency division multiplexing, provides way to reassemble multipath MMDS signals at receiving site. Cisco said its technology provides means to reorder signals so they appear to arrive in single stream from one location, even if obstacles are in path of original MMDS signal. For CE suppliers, integrated chip manufacturers and systems integrators that are part of group, Cisco is providing technology free. Spokesman differentiated Cisco's effort to set de facto standard by encouraging broad industry use of its technology from IEEE effort, "which is trying to set a binding standard." Cisco has said it plans to use new wireless data standard to fill coverage gaps for various carriers (CD Dec 2 p2). More broadly, company has likened its standards effort to that for Data Over Cable Service Interference Specification (DOCSIS), which set standards for next-generation cable modems.

Before MCI WorldCom and Sprint began MMDS consolidation spree last year, operators had met in Breckenridge, Colo., to work on issues such as common band plans and desired-to-undesired interference ratios, which is measurement of interference, MCIW Program Mgr. Bill Feidt said. "To date, most of the interference criteria was best suited for downstream broadcast licensing," he said. "As we go to set up the 2-way cellular types of designs and more of a data-centric service" different interference parameters have to be examined, he said. Group has stepped up activities in last several weeks and has begun to assess working agreement. Group is attempting to reach agreement on those issues in advance of July 3, which is first FCC window for 2-way applications to be filed. "It needs to be done in ample time," he said, and group has discussed May time frame for agreement. Without broader agreement on such interference issues, "it would have to be done on a license-by-license, market-by-market, design-by-design basis," he said. "It's our intent to try to make this a complete industry agreement."

Broad industry effort for 2-way planning issues represents search for more flexible approach than that laid out in FCC's 1998 order allowing 2-way transmissions (CD Sept 18/98 p5), said Robert Rini, managing attorney, Rini, Coran & Lancellotta. FCC's 2-way ruling had cleared way for MMDS licensees to group multiple channels for bandwidth-intensive services or to separate channels into smaller pieces for narrowband transmissions. As result, order cleared way for those licensees to begin providing 2-way services such as broadband Internet access. Industry group is eyeing way to provide same level of protection in rules but in more flexible manner than stringent requirements in federal rule, which was based on "very conservative interference assumptions," Rini said. "It's a way to accommodate that on a voluntary basis," he said. "Clearly the FCC would rather see licensees work out interference issues themselves and the FCC not have to referee those issues." One example of where flexibility is being sought is that in FCC rule there is no de minimis exception. That means that if operator transmits signal over sparsely populated areas such as mountaintops, licensee still must obtain consent to ensure operations don't interfere with competitors' signals. "The FCC has delegated to a large degree the concept of interference management to the industry," Rini said. — ***Mary Greczyn***

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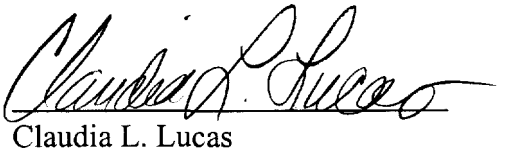

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